

Correlation of Ontario Mathematics 2005 Curriculum to Addison Wesley Math Makes Sense 4

Number Sense and Numeration

Overall Expectations

By the end of Grade 4, students will:

- read, represent, compare, and order whole numbers to 10 000, decimal numbers to tenths, and simple fractions, and represent money amounts to \$100;
- demonstrate an understanding of magnitude by counting forward and backwards by 0.1 and by fractional amounts;
- solve problems involving the addition, subtraction, multiplication, and division of single- and multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to tenths and money amounts, using a variety of strategies;
- demonstrate an understanding of proportional reasoning by investigating whole-number unit rates.

Students will:

Specific Expectations	<i>Addison Wesley Mathematics Makes Sense Grade 4, lessons:</i>
<i>Quantity Relationships</i> represent, compare, and order whole numbers to 10 000, using a variety of tools (e.g., drawings of base ten materials, number lines with increments of 100 or other appropriate amounts);	2.1, 2.3
demonstrate an understanding of place value in whole numbers and decimal numbers from 0.1 to 10 000, using a variety of tools and strategies (e.g., use base ten materials to represent 9307 as $9000 + 300 + 0 + 7$);	2.1, 2.3, 8.8
read and print in words whole numbers to one thousand, using meaningful contexts (e.g., books, highway distance signs);	2.1
round four-digit whole numbers to the nearest ten, hundred, and thousand, in problems arising from real-life situations;	2.2

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
represent, compare, and order decimal numbers to tenths, using a variety of tools (e.g., concrete materials such as paper strips divided into tenths and base ten materials, number lines, drawings) and using standard decimal notation;	8.8
represent fractions using concrete materials, words, and standard fractional notation, and explain the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered;	8.1, 8.3
compare and order fractions (i.e., halves, thirds, fourths, fifths, tenths) by considering the size and the number of fractional parts (e.g., $\frac{4}{5}$ is greater than $\frac{3}{5}$ because there are more parts in $\frac{4}{5}$; $\frac{1}{4}$ is greater than $\frac{1}{5}$ because the size of the part is larger in $\frac{1}{4}$);	8.7 with supporting TG note
compare fractions to the benchmarks of $0, \frac{1}{2},$ and 1 (e.g., $\frac{1}{8}$ is closer to 0 than to $\frac{1}{2}$; $\frac{3}{5}$ is more than $\frac{1}{2}$);	8.2
demonstrate and explain the relationship between equivalent fractions, using concrete materials (e.g., fraction circles, fraction strips, pattern blocks) and drawings (e.g., “I can say that $\frac{3}{6}$ of my cubes are white, or half of the cubes are white. This means that $\frac{3}{6}$ and $\frac{1}{2}$ are equal.”);	8.5
read and represent money amounts to \$100 (e.g., five dollars, two quarters, one nickel, and four cents is \$5.59);	6.5, 6.6
solve problems arise from real-life situations and that relate to the magnitude of whole numbers up to 10 000;	2.1 with supporting BLM

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<p><i>Counting</i> count forward by halves, thirds, fourths, and tenths to beyond one whole, using concrete materials and number lines (e.g., use fraction circles to count fourths: “one fourth, two fourths, three fourths, four fourths, five fourths, six fourths, ...”);</p>	8.1 with supporting TG note
<p>count forward by tenths from any decimal number expressed to one decimal place, using concrete materials and number lines (e.g., use base ten materials to represent 3.7 and count forward: 3.8 3.9, 4.0, 4.1, ...; “Three and seven tenths, three and eight tenths, three and nine tenths, four, four and one tenth, ...”);</p>	8.8 with supporting TG note
<p><i>Operational Sense</i> add and subtract two-digit numbers using a variety of mental strategies (e.g., one way to calculate $73 - 39$ is to subtract 40 from 73 to get 33, and then add 1 back to get 34);</p>	2.5, 2.9 with supporting TG notes
<p>solve problems involving the addition and subtraction of four-digit numbers, using student-generated algorithms and standard algorithms (e.g., “I added $4217 + 1914$ using $5000 + 1100 + 20 + 11$.”);</p>	2.6, 2.7, 2.8, 2.9, 2.10, 2.11
<p>add and subtract decimal numbers to tenths, using concrete materials (e.g., paper strips divided into tenths, base ten materials) and student-generated algorithms (e.g., “When I added 6.5 and 5.6, I took five tenths in fraction circles and added six tenths in fraction circles to give me one whole and one tenth. Then I added $6 + 5 + 1.1$, which equals 12.1.”);</p>	8.11, 8.12
<p>add and subtract money amounts by making simulated purchases and providing change for amounts up to \$100, using a variety of tools (e.g., currency manipulatives, drawings);</p>	8.13
<p>multiply to 9×9 and divide to $81 \div 9$, using a variety of mental strategies (e.g., doubles, doubles plus another set, skip counting);</p>	4.1, 4.2, 4.3, 4.8, 4.9, 4.10
<p>solve problems involving the multiplication of one-digit numbers, using a variety of mental strategies (e.g., 6×8 can be thought of as $5 \times 8 + 1 \times 8$);</p>	4.3

Specific Expectations	<i>Addison Wesley Mathematics Makes Sense Grade 4, lessons:</i>
multiply whole numbers to 10, 100, and 1000, and divide whole numbers by 10 and 100, using mental strategies (e.g., use a calculator to look for patterns and generalize to develop a rule);	4.4 with supporting BLM
multiply two-digit whole numbers by one-digit whole numbers, using a variety of tools (e.g., base ten materials or drawings of them, arrays), student-generated algorithms, and standard algorithms;	4.6, 10.2
divide two-digit whole numbers by one-digit whole numbers, using a variety of tools (e.g., concrete materials, drawings) and student-generated algorithms;	4.11, 4.12, 10.7
use estimation when solving problems involving the addition, subtraction, and multiplication of whole numbers, to help judge the reasonableness of a solution;	2.4, 2.8, 4.5
<i>Proportional Relationships</i> describe relationships that involve simple whole-number multiplication (e.g., “If you have 2 marbles and I have 6 marbles, I can say that I have three times the number of marbles you have.”);	4.2, 4.3 with supporting TG notes
determine and explain, through investigation, the relationship between fractions (i.e., halves, fifths, tenths) and decimals to tenths, using a variety of tools (e.g., concrete materials, drawings, calculators) and strategies (e.g., decompose $\frac{2}{5}$ into $\frac{4}{10}$ by dividing each fifth into two equal parts to show that $\frac{2}{5}$ can be represented as 0.4);	8.8, Technology feature, page 297, with supporting TG note
demonstrate an understanding of simple multiplicative relationships involving unit rates, through investigation using concrete materials and drawings (e.g., scale drawings in which 1 cm represents 2 m).	10.4 with supporting TG note

Measurement

Overall Expectations

By the end of Grade 4, students will:

- estimate, measure, and record length, perimeter, area, mass, capacity, volume, and elapsed time, using a variety of strategies;
- determine the relationships among units and measurable attributes, including the area and perimeter of rectangles.

Students will:

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<i>Attributes, Units, and Measurement Sense</i> estimate, measure and record length, height, and distance, using standard units (i.e., millimetre, centimetre, metre, kilometres) (e.g., a pencil that is 75 mm long);	9.1, 9.2
draw items using a ruler, given specific lengths in millimetres and centimetres;	9.1, 9.2
estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest minute;	6.1, 6.2
estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in five-minute intervals, hours, days, weeks, months, or years;	6.3, 6.4 with supporting TG note
estimate, measure using a variety of tools (e.g., centimetre grid paper, geoboard) and strategies, and record the perimeter and area of polygons;	9.6, 9.7, 9.8, 9.9, 9.10, 9.11
estimate, measure, and record the mass of objects (e.g., apple, baseball, book), using the standard units of the kilogram and the gram;	6.9
estimate, measure, and record the capacity of containers (e.g., a drinking glass, a juice box), using the standard units of the litre and the millilitre;	6.8
estimate, measure using concrete materials, and record volume, and relate volume to the space taken up by an object (e.g., use centimetre cubes to demonstrate how much space a rectangular prism takes up);	3.11 with supporting TG note

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<i>Measurement Relationships</i> describe, through investigation, the relationship between various units of length (i.e., millimetre, centimetre, decimetre, metre, kilometre);	9.1, 9.2, 9.3, 9.5
select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure the side lengths and perimeters of various polygons;	9.6, 9.7
determine, through investigation, the relationship between the side lengths of a rectangle and its perimeter and area;	9.13A (TG lesson)
pose and solve meaningful problems that require the ability to distinguish perimeter and area (e.g., “I need to know about area when I cover a bulletin board with construction paper. I need to know about perimeter when I make the border.”);	9.11
compare and order a collection of objects, using standard units of mass (i.e., gram, kilogram) and/or capacity (i.e., millilitre, litre);	6.8, 6.9
determine, through investigation, the relationship between grams and kilograms;	6.9
determine, through investigation, the relationship between millilitres and litres;	6.8
select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram) and the most appropriate standard unit to measure the capacity of a container (i.e., millilitre, litre);	6.8, 6.9
solve problems involving the relationship between years and decades, and between decades and centuries;	6.1
compare, using a variety of tools (e.g., geoboard, pattern blocks, dot paper), two-dimensional shapes that have the same perimeter or the same area.	9.12, 9.13

Geometry and Spatial Sense

Overall Expectations

By the end of Grade 4, students will:

- identify quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks;
- construct three-dimensional figures, using two-dimensional shapes;
- identify and describe the location of an object, using a grid map, and reflect two-dimensional shapes.

Students will:

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<i>Geometric Properties</i> draw the lines of symmetry of two-dimensional shapes, through investigation, using a variety of tools (e.g., Mira, grid paper) and strategies (e.g., paper folding);	7.4
identify and compare different types of quadrilaterals (i.e., rectangle, square, trapezoid, parallelogram, rhombus) and sort and classify them by their geometric properties (e.g., sides of equal length; parallel sides; symmetry; number of right angles);	3.4, 3.5, 3.6
identify benchmark angles (i.e., straight angle, right angle, half a right angle), using a reference tool (e.g., paper and fasteners, pattern blocks, straws) and compare other angles to these benchmarks (e.g., “The angle the door makes with the wall is smaller than a right angle but greater than half a right angle.”);	3.2, 3.3 with supporting TG note
relate the names of benchmark angles to their measure in degrees (e.g., a right angle is 90°);	3.3
identify and describe prisms and pyramids, and classify them by their geometric properties (i.e., shapes of faces, number of edges, number of vertices), using concrete materials;	3.8, 3.9
<i>Geometric Relationships</i> construct a three-dimensional figure from a picture or model of the figure, using connecting cubes (e.g., use connecting cubes to construct a rectangular prism);	3.8A (TG lesson)

Specific Expectations	<i>Addison Wesley Mathematics Makes Sense Grade 4, lessons:</i>
construct skeletons of three-dimensional figures, using a variety of tools (e.g., straws and modelling clay, toothpicks and marshmallows, Polydrons), and sketch the skeletons;	3.10
draw and describe nets of rectangular and triangular prisms;	3.10A (TG lesson)
construct prisms and pyramids from given nets;	3.10A (TG lesson)
construct three-dimensional figures (e.g., cube, tetrahedron), using only congruent shapes;	3.8A (TG lesson)
<i>Location and Movement</i> identify and describe the general location of an object using a grid system (e.g., “The library is located at A3 on the map.”);	7.1
identify, perform, and describe reflections using a variety of tools (e.g., Mira, dot paper, technology);	7.3
create and analyse symmetrical designs by reflecting a shape, or shapes, using a variety of tools (e.g., pattern blocks, Mira, geoboard, drawings), and identify the congruent shapes in the designs.	7.6, 10.9

Patterning and Algebra

Overall Expectations

By the end of Grade 4, students will:

- describe, extend, and create a variety of numeric and geometric patterns, make predictions related to the patterns, and investigate repeating patterns involving reflections
- demonstrate an understanding of equality between pairs of expressions, using addition, subtraction, and multiplication.

Students will:

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<i>Patterns and Relationships</i> extend, describe, and create repeating, growing, and shrinking number patterns (e.g., “I created the pattern 1, 3, 4, 6, 7, 9 ... I started at 1, then added 2, then added 1, then added 2, then added 1, and I kept repeating this.”);	1.1, 1.2, 1.3
connect each term in a growing or shrinking pattern with its term number (e.g., in the sequence 1, 4, 7, 10, ..., the first term is 1, the second term is 4, and the third term is 7, and so on) and record the patterns in a table of values that shows the term number and the term;	1.1, 10.4, 10.5 with supporting TG note
create a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words (e.g., the pattern rule “start at 1 and multiply each term by 2 to get the next term” generates the sequence 1, 2, 4, 8, 16, 32, 64, ...);	1.2, 10.4, 10.5
make predictions related to repeating geometric or numeric patterns;	10.1, 10.4, 10.5
extend and create repeating patterns that result from reflections, through investigation using a variety of tools (e.g., pattern blocks, dynamic geometry software, dot paper);	7.6
<i>Expressions and Equality</i> determine, through investigation, the inverse relationship between multiplication and division (e.g., since $4 \times 5 = 20$, then $20 \div 5 = 4$; since $35 \div 5 = 7$, then $7 \times 5 = 35$);	4.8, 4.9

Specific Expectations	<i>Addison Wesley Mathematics Makes Sense Grade 4, lessons:</i>
determine the missing number in equations involving multiplication of one- and two-digit numbers, using a variety of tools and strategies (e.g., modeling with concrete materials, using guess and check with and without the aid of a calculator);	4.6 with supporting TG note
identify, through investigation (e.g., by using sets of objects in arrays, by drawing area models) and use the commutative property of multiplication to facilitate computation with whole numbers (e.g., “I know that $15 \times 7 \times 2$ equals $15 \times 2 \times 7$. This is easier to multiply in my head because I get $30 \times 7 = 210$.”);	4.2
identify, through investigation (e.g., by using sets of objects in arrays, by drawing area models), and use the distributive property of multiplication over addition to facilitate computation with whole numbers (e.g., “I know that 9×52 equals $9 \times 50 + 9 \times 2$. This is easier to calculate in my head because I get $450 + 18 = 468$.”).	4.6, 10.2

Data Management and Probability

Overall Expectations

By the end of Grade 4, students will:

- collect and organize discrete primary data and display the data using charts and graphs, including stem-and-leaf plots and double bar graphs;
- read, describe, and interpret primary data and secondary data presented in charts and graphs, including stem-and-leaf plots and double bar graphs;
- predict the results of a simple probability experiment, then conduct the experiment and compare the prediction to the results.

Students will:

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
<i>Collection and Organization of Data</i> collect data by conducting a survey (e.g., “Choose your favourite meal from the following list: breakfast, lunch, dinner, other.”) or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements;	5.4, 5.6, Unit 5 Problem
collect and organize discrete primary data and display data in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs) that have appropriate titles, labels (e.g., appropriate units marked on the axes) and scales (e.g., with appropriate increments) that suit the range and distribution of the data, using a variety of tools (e.g., graph paper, simple spreadsheets, dynamic statistical software);	5.4, 5.5, 5.6A (TG lesson), 5.6B (TG lesson)
<i>Data Relationships</i> read, interpret, and draw conclusions from primary data (e.g., survey results, measurements, observations) and from secondary data (e.g., temperature data in the newspaper, data from the Internet about endangered species), presented in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs);	5.1, 5.2, 5.3, 5.6A (TG lesson), 5.6B (TG lesson)
demonstrate, through investigation, an understanding of median (e.g., “The median is the value in the middle of the data. If there are two middle values, you have to calculate the middle of those two values.”), and determine the median of a set of data (e.g., “I used a stem-and-leaf plot to help me find the median.”);	5.6C (TG lesson)

Specific Expectations	Addison Wesley Mathematics Makes Sense Grade 4, lessons:
describe the shape of a set of data across its range of values, using charts, tables, and graphs (e.g., “The data values are spread out evenly.”; “The set of data bunches up around the median.”);	5.6C (TG lesson), 5.6B (TG lesson)
compare similarities and differences between two related sets of data, using a variety of strategies (e.g., by representing the data using tally charts, stem-and-leaf plots, or double bar graphs; by determining the mode or the median; by describing the shape of a data set across its range of values);	5.6A (TG lesson), 5.6B (TG lesson)
<i>Probability</i> predict the frequency of an outcome in a simple probability experiment, explaining their reasoning, conduct the experiment; and compare the result with the prediction;	11.4, 11.5
determine, through investigation, how the number of repetitions of a probability experiment can affect the conclusions drawn.	11.5